

NOTES ON A COLLECTION OF SNAKES FROM THE
KHASI HILLS, ASSAM.

BY

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During August, September, and October this year in Shillong I acquired, among other natural history objects, a large and fairly representative collection of snakes, amounting to 264 specimens, representing 29 species, of which one, a *Typhlops*, is new to science. This I propose to name *tephrosoma*. The locality is a peculiarly attractive one to the collector, as much from the interest attaching to it from geographical considerations as for the abundance of the species available, many of which seem to be peculiar to this and the neighbouring hills.

Shillong is situated in the Khasi Hills of Assam at an altitude of 4,900 feet. From 4,500 to 5,500 feet probably indicates the outside limits from which all the specimens were derived with one exception, *viz.*, *Dipsadomorphus cyaneus*, which I got at Nongpho (1,800 feet).

Referring to Boulenger's Catalogue of the Snakes in the British Museum (1893 to 1896), Selater's List of Snakes in the Indian Museum (1891), and my own notes which include two new species, the descriptions of which appear in this issue, there are at least 79 species known to inhabit Assam. Some of these appear to be restricted to the Hills, but it would be difficult to define the limits of elevation within which they occur. Similarly, it is impossible to fix any limit to the elevation to which the species commonly met with in the plains may wander.

The mortality from snakebite appears to be insignificant. The Khasis that I interrogated assured me that though snakebite casualties were not uncommon, fatalities were rare. This received confirmation in two quarters. The Cantonment Magistrate in answer to my enquiries informed me that since 1899 (prior to which no records are available) no death within Cantonments had been returned as due to snakebite. Again, at the Civil Hospital I was told that cases of snakebite were not uncommon. Many of the cases, however, merely received treatment, and insisted on returning to their homes, the ultimate issue of these cases being lost sight of, but no death had been reported. Of eight cases that were actually admitted into this

Institution since 1902 (prior to which there are no records), all recovered, and were discharged in from one to five days.

At the altitude of Shillong at least 10, possibly all of the 12 poisonous species recorded from Assam, may be met with. These are as follows :—(1) *Bungarus bungaroides*, (2) *B. fasciatus*, (3) *B. lividus*, (4) *Naiia tripudians*, (5) *N. bungarus*, (6) *Callophis maclellandi*, (7) *Ancistrodon himalayanus*, (8) *Lachesis monticola*, (9) *L. jerdoni*, (10) *L. mucrosquamatus*, (11) *L. purpureomaculatus*, (12) *L. gramineus*.

I am not aware of Nos. 2 and 3 having been met with at this elevation, but see no reason why an occasional specimen should not occur, seeing that I obtained one specimen of *Naiia tripudians* in Shillong and saw a specimen of *Bungarus fasciatus* which had been killed on the Ghat road, at an elevation of probably about 3,000 feet.

Of the 12 poisonous species at present known and just enumerated, only two are common, viz., *Lachesis monticola* and *Callophis maclellandi*. With the exception of *Lachesis gramineus* which holds an intermediate position, all the other varieties are decidedly uncommon. I think there can be little doubt that *Lachesis monticola* is responsible for a very large majority of the cases of snake-poisoning which occur. Its abundance, its quick temper, and the swiftness with which it unhesitatingly inflicts a bite justify such a conclusion : and this is amply confirmed by the reports of the Khasis who very consistently declared its evil reputation ; and though the names they gave to other species were notably inconsistent, they all were unanimous in calling this “ B’sein longkru.” *Callophis maclellandi* appears to be a very peaceably inclined creature, if not actually timid. It rarely attains a length of 2 feet, but of course length has little bearing on the virulence of a poison. Repeated enquiries failed to elicit any information with regard to its bite which I think significant. A snake so common and at the same time so striking in appearance could, I think, hardly escape an evil reputation if serious consequences or death attended its bite. It is noteworthy that the records available of the cases of snakebite admitted into the Civil Hospital show that in no case were any constitutional symptoms observed, though local effects were usually pronounced. This points to a viperine type of poisoning rather than a colubrine, and adds support to the supposition that *Lachesis monticola* is to be blamed rather than *Callophis maclellandi* for the majority of casualties due to snake-poisoning.

I have adhered to the nomenclature set forth in Boulenger's Catalogue of the Snakes in the British Museum (1893 to 1896).

With one or two exceptions, the names given me by the Khasis expressed such a diversity of opinion that I have had to abandon any attempt to give vernacular names.

Family 1.—TYPHLOPIDÆ.

Typhlops diardi.

I obtained one very fine adult, 1 foot $6\frac{1}{4}$ inches long of this the commonest *Typhlops* to be found in the plains of Burma and Assam. Like many other species common in the plains, it occurs up to 5,000 feet altitude or even higher, but becomes increasingly scarcer up to these elevations.

The scales anteriorly were 26, in midbody 26, and posteriorly 24. This I find the usual arrangement of scales in this species, and the reduction of rows from 26 to 24 is brought about by the absorption of the row next to the median ventral into the median ventral.

Typhlops tephrosoma, sp. nov.

A single small specimen of this genus, measuring $7\frac{1}{2}$ inches, was brought to me on the 24th of August, which is sufficiently distinctive to warrant specific rank.

Description.—Snout rounded; nostrils lateral. *Rostral*. Upper portion about one-third the width of the head, not extending as far back as a line connecting the anterior edges of the eyes. *Nasal*. Not completely divided, the superior suture issuing from the nostril not reaching the rostral; the inferior suture running to the 2nd labial. *Præocular*. Subequal to the ocular, in contact with the 2nd and 3rd labials. *Eyes*. Very indistinct and small. *Ocular* touching the 3rd and 4th labials. Diameter of body $\frac{3}{4}$ th the body length. *Scales*. Anteriorly 28, midbody 28, posteriorly 24. *Colour*. Pale ashy grey rather darker dorsally.

None of the other species found within our Indian area has the scales in 28 rows, except *acutus*, a very distinct form, peculiar specially in the conformation of the snout.

Tephrosoma is most like *diardi*, differing in the scales numbering 28, the rostral not extending as far back as the eyes, the small indistinct eyes, and the colour.

Family 7.—COLUBRIDÆ.

Subfamily 2.—COLUBRINÆ.

Polyodontophis collaris.

I acquired 24 specimens, 12 ♀, 10 ♂ and 2 not sexed. The largest a ♀ measured 2 feet 8 inches.

Food.—Only two had recently fed. One contained “in gastro” the tip of a snake’s tail, peculiar in that the subcaudals were entire, and it is probable that the species is one hitherto unknown to science. The other had eaten a skink, *Lygosoma indica*.

Breeding.—Two specimens were doubtless this year’s progeny— one obtained on the 10th September, measuring 9 inches; the other on the 15th September, 10 inches. It was noticed that the secretion of the anal glands in the former was abundant, and odoriferous as in adults, and this is in consonance with my observations regarding many other species, which makes me doubtful whether these glands are associated with the sexual functions at all, as is assumed by Darwin* and others. The secretion of these glands in *collaris* is custardlike in colour and consistency.

Shield characters.—The scales are 17 in the whole body length. With two exceptions, the supralabials were 10, the 4th, 5th and 6th touching the eye, and the 10th largest. This last is an important feature, which, taken in conjunction with the number of the labials will, I believe, suffice to identify this from all other Indian Snakes. The temporals were alike in all, a single anterior shield being in contact with the 8th only of the supralabial series. The ventrals in the ♀ varied from 168 to 179, in the ♂ from 168 to 174. *Subcaudals*, ♀ 103 to 112, ♂ 107 to 118. At least 10 specimens had the tail imperfect.

Anomalies.—The last ventral was divided in 2 specimens. The supralabials were 9 in 2 specimens on the left side only, in one the 4th and 5th only and in the other the 6th also touched the eye.

In all specimens the rufous collar was very conspicuous. Though usually very sombre in its dorsal colouration, some specimens were enlivened with a rich ruddy glow in the dark brown. The belly was bright yellow, and merged into a bright carrotty-red at the edge of the ventrals.

* Descent of Man, p. 539.

It is one of the commonest snakes about Shillong, and appears to be restricted mainly, if not entirely, to upland regions. Out of some two or three hundred snakes collected by me in Dibrugarh not one representative of this species has reached me as yet.

I encountered two examples alive, but both, though active and making every endeavour to escape, did not bite me, nor the stick laid over them when effecting capture.

Tropidonotus parallelus.

I acquired but one of this seemingly upland species, which appears to be as uncommon as it is localised. This was a ♀ 2 feet 4 inches long, the tail $7\frac{1}{2}$ inches. The ventrals are 163, subcaudals 80. Præoculars 2. Temporals 2 anterior. Scales 19 anteriorly, 19

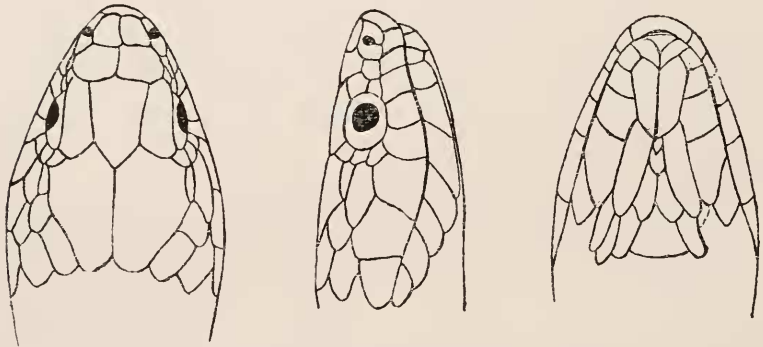


Fig 1
Tropidonotus parallelus
(x 2)

in midbody, 17 posteriorly. The reduction in rows from 19 to 17 is effected by the coalescence of the 3rd and 4th above the ventrals. The dorsal pale bands are not very conspicuous. The underparts are bright yellow.

Tropidonotus khasiensis.

Eleven specimens, 3 ♂, 4 ♀ and 4 not sexed of this snake which is only known from the Khasi Hills* came to bag. The largest was a ♂ 2 feet $2\frac{5}{8}$ inches. Ventrals ♂ 153 to 155, ♀ 148 to 155. Subcaudals ♂ 91 to 96, ♀ 88 to 89. Præoculars single in all. Scales 19 anteriorly, 19 in midbody, 17 posteriorly. The reduction from

* Anandale records it with doubt from Burma (Journ. Asiat. Soc. Bengal., 1905, p. 210).

19 to 17 is occasioned by a confluence of the 3rd and 4th rows above the ventrals.

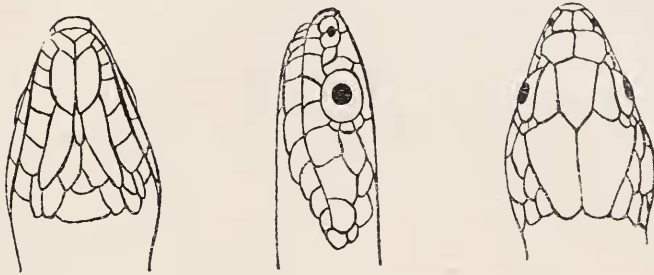


Fig. 2
Tropidonotus khasiensis
(x 2)

Anomalies.—Eight supralabials in three specimens, the 3rd, 4th and 5th touching the eye on both sides in one, the 4th and 5th only on the left side in two examples.

Breeding.—2 young measuring $7\frac{1}{2}$ and $7\frac{5}{8}$ inches were obtained in October. The secretion of the anal glands is custardlike in colour and consistency. All specimens are blackish-brown (not pale-brown as stated by Boulenger in his Catalogue, Vol. I., p. 223) dorsally, with obscure black spots showing a tendency to transverse distribution. A more or less distinct (usually obscure) nut-brown or rufous series of dorsal spots on the 6th row above the ventrals, much as in *himalayanus*. The upper labials white (not yellow), finely speckled with black especially about the sutures. A yellow streak from above gape to the sides of the neck. Underparts white (not yellow), with a regular row of conspicuous black, lateral, ventral spots, often more or less confluent.

I captured one at dark whilst it was trying to cross the road. It was very active, and gave me some trouble, partly owing to my caution in dealing with a snake it was too dark to recognise.

Tropidonotus piscator.

I obtained 45 examples, a large number of which were young of this year. All the specimens were olive-green, or olive-brown with black, blackish, or obscure quincuncial spots of various size, and thus conformed to the varieties, *punctatus*, *quincunciatus*, and *obscurus*, referred to in my paper on this species in an earlier issue of this Journal

(Vol. XVII., pp. 861-2.) It is perhaps remarkable that no highly ornamented varieties were met with when one considers the brilliancy of the red adornment in the species *subminiatus* and *himalayanus* collected in these Hills.

Breeding.—The first point deserving mention is the lateness of the breeding season in these Hills as compared with that in the plains. In Shillong eggs were hatching in August and late in September, whereas in Dibrugarh this year they were hatching in June. It seems to me one should expect rather the reverse, for where the climate is temperate, and the cold season severer, and more protracted, it would seem important to the life of the offspring that they should be cast adrift early, to allow of their obtaining an ample sustenance to prepare them for the period of hibernation.

Eggs.—On the 8th of August, 10 eggs were brought to me, measuring from $1\frac{1}{2}$ to $1\frac{7}{10}$ inches. An embryo was extracted from one which proved to be $5\frac{3}{4}$ inches long. On the 2nd September another was extracted, which was $7\frac{1}{2}$ inches long. On the 8th September one hatched; 3 more hatched on the 14th, 2 on the 16th, 1 on the 17th, and the last on the 18th. These hatchlings varied in length from $7\frac{1}{2}$ to $8\frac{1}{2}$ inches.

The exit apertures in the eggs were very variable in number and extent. In one egg there were as many as 6 cuts, more or less parallel in direction, the longest over half an inch long. In another there was but one cut and this only a quarter of an inch in length, through which the embryo had managed to squeeze itself.

Young.—In August I obtained 12 of this year's progeny measuring from $6\frac{3}{4}$ to $9\frac{1}{4}$ inches. In September I got 3 hatchlings from $7\frac{1}{2}$ to $9\frac{1}{4}$ inches in length, the smallest of which was obtained as late as the 22nd.

In the specimens I hatched out, the faecal tooth was plainly to be seen and felt. Its attachment is firm. Seen in profile, it is hardly or not apparent, as it does not project beyond the rostral; in fact, this shield must be flattened to permit of this structure being brought into use. The cutting edge, which is directed forwards, is seen to be practically bidentate owing to a shallow, but broad, median emargination. A figure is given showing its position, and form on page 501 of this issue, contrasted with a similar structure in the Indian slow-worm.

Anomalies.—In one example the anal shield was entire, and in another there were three internasals, 1+2. It is to be noted that in all these specimens the carination of the scales is rather feebler than that usually met with, so that it is possible they might be referred by some to the species *sanctijohannis* of Boulenger's Catalogue (Vol. I., p. 230).

These specimens, however, conform so completely with my conception of the species *piscator* that I do not hesitate to pronounce them as such, especially as I find that the degree of keeling in this as in all other keeled snakes with which I am familiar is subject to considerable variation.

Tropidonotus himalayanus.

Six specimens, 2 ♂, 3 ♀, 1? all adults, varying from 1 foot 11½ to 2 feet 8 inches. Ventrals, ♂ 157 to 162, ♀ 164 to 165. Subcaudals, ♂ 79 to 82, ♀ 82 to 85. Scales, anteriorly 19, (except in one where they counted 17), midbody 19, posteriorly 17. The reduction from 19 to 17 is caused by the confluence of the 3rd and 4th rows above the ventrals. Labials, 8, the 4th and 5th touching the eye in all.

Anomaly.—One specimen has 4 postoculars on one side.

All the specimens were remarkable for the brilliancy of their adornment—a feature to which Boulenger makes no reference. (Catalogue, Vol. I., p. 251.) Besides the more or less conspicuous yellow or orange collar with its broader black posterior border mentioned by Boulenger, these specimens were ornamented behind the yellow with an intensely brilliant chequering of vermilion, more or less apparent in the anterior half of the body, but reducing in brilliancy from before backwards. These specimens constitute a very distinct colour variety, to which *ornatus* would be appropriate. I am familiar with the species, as I have obtained several specimens this year in Dibrugarh. None of these, however, are ornamented with red, though the orange collar is as conspicuous as in the Hill form. One specimen I caught alive just below Shillong. It moved as expeditiously as others of this genus, but made no attempt to bite me, confining its efforts to violent struggles for liberty. When grasped by the tail, it immediately described a rapid corkscrew movement of the body, which caused this appendage to snap off in my hands, and restored a liberty of brief duration. This is a common manœuvre with snakes, and

accounts for a large number of the species of *Tropidonoti* in particular that are brought in to one with imperfect tails. I was less fortunate with a second specimen encountered the same day as the above. It disappeared like a flash down a steep incline, where I could not follow it.

Tropidonotus stolatus.

34 specimens. With few exceptions, these had 7 supralabials, the 3rd and 4th touching the eye.

Anomalies.—One specimen had two loreals $\frac{1}{2}$ on each side. The temporals were two on both sides in one example. Supralabials 6 in three specimens on one side, the 2nd and 3rd touching the eye in one, and the 3rd only in two specimens; 7, the 4th only touching the eye on both sides in one specimen.

Breeding.—The season as in the case of *piscator* is much later in these Hills than in the plains.

In Dibrugarh this year I had many gravid mothers in April, May, and June, and the young were hatching in June and July. In Shillong I had an unusually large gravid ♀, measuring 2 feet 5 inches, brought to me on the 10th of August, and another with three eggs on the 25th of that month. On the 8th of August a ♀ was brought in with 7 clustered eggs with which she was stated to have been found. One was opened, and contained an embryo $3\frac{1}{2}$ inches long. They were kept, but failed to hatch out.

Eggs.—These varied considerably, the smallest was $1\frac{1}{8} \times \frac{3}{4}$ and the largest $1\frac{3}{8} \times \frac{5}{8}$ inch.

Food.—Six specimens had fed, and had taken frogs in every case.

No examples were adorned with red.

Tropidonotus subminiatus.

12 examples, 4 ♂, 4 ♀, 4 not sexed. The largest was a ♀, 3 feet $6\frac{1}{2}$ inches long. Ventrals, ♀ 158 to 169, ♂ 160 to 168. The tail was imperfect in all the examples but three, in which they varied from 83 to 97. Scales, 19 anteriorly, 19 in midbody, 17 posteriorly. As in others of this genus, the reduction from 19 to 17 is due to a coalescence of the 3rd and 4th rows above the ventrals.

Anomalies.—The præoculars were two in two specimens. Supralabials 8, with the 3rd and 4th touching the eye in one example, the 4th and 5th touching the eye in three; 9, the 4th, 5th and 6th touching the eye in two examples on both sides, and in one on one side.

Food.—One had eaten a frog.

Breeding.—A juvenile specimen obtained in October was $8\frac{3}{4}$ inches long.

In certain aberrant specimens the supralabials conform to the arrangement usually met with in *himalayanus* and these are very apt to be confused with this latter species. *Subminiatus* is, I think, of stouter habit, but perhaps even a practised eye might be misled in this particular. The colour in these examples is of great importance. In all the specimens of *subminiatus* that I have met with and I have seen many from various altitudes in Burma, one from the plains of Assam (Dibrugarh), and several from the Khasi Hills the vermilion adornment is very distinctive. It forms a broad band behind the orange collar without the intervention of any black, but no chequering on the body. The most conspicuous chequering on the dorsum is of a bright yellow hue, especially anteriorly. This becomes progressively more obscure posteriorly, but is more or less apparent in the entire body length.

Pseudoxenodon macrops.

One example, a ♂, 2 feet $9\frac{1}{4}$ inches long, the tail $6\frac{1}{2}$ inches. Ventrals 162. Subcaudals 65. Scales anteriorly 19, in midbody a reduction takes place to 17, posteriorly 15. The reduction from 19 to 17 is caused by a coalescence of the 3rd and 4th rows above the ventrals; the second reduction from 17 to 15 I have omitted to remark upon. If the step from 19 to 17 occurs with constancy in midbody, this snake is, I think, unique among our Indian species. As far as I am aware, in only one other snake of this family does reduction take place at this spot, *viz.*, *Zamenis mucosus*, many examples of which reduce (in this case from 17 to 16) at or even before the middle of the body.

Colour.—This agrees with Boulenger's description (Catalogue, Vol. I., p. 271), except that there is no distinct postocular streak, and the dorsal colour is olive-green with lighter transverse bars most distinct in the posterior part of the body. A pinkish-brown streak occurs at the edge of the ventrals.

Trachischium monticola.

Twenty-eight examples, 13 ♂, 13 ♀, 2 not sexed. Seven females are longer than any males. The longest ♀ was 10 and the longest

♂ $8\frac{1}{2}$ inches. Ventrals, ♂ 116 to 124 (127?), ♀ 123 to 128. Subcaudals, ♂ 27 to 33, ♀ 25 to 28. The scales are 15 in the whole body length. The eye is black, and the pupil not discernible in life.

Colour.—The dorsal brown colour varies. It is usually dark, and at times almost black. The scales are outlined with black in specimens of a lighter hue. The belly in all is uniform berry-red, much the tint of a raspberry. Beneath the tail the hue is darker, and in the neck becomes yellow, or dull orange.

My wife encountered one on our garden path after dark, discerning its form in the moonlight. It remained perfectly still for a minute or so till I arrived with a lantern. Even then it made no attempt to escape, but lay quiet and extended. It made little, if any, resistance to capture and when taken indoors, moved about not uneasily in my grasp and with little show of timidity. It was only $7\frac{1}{2}$ inches long and quite an attractive little creature in its manners.

It is one of the commonest snakes about Shillong. One man brought me in eleven specimens in one day, which, he said, he had found beneath stones. It is probably the most diminutive species among our Indian representatives of this family.

Rhabdops bicolor.

Seven specimens, 5 ♂, 2 ♀. The largest was a ♀, 2 feet and $2\frac{5}{8}$ inches long. Ventrals, ♂ 209 to 217, ♀ 195 and 196. Subcaudals, ♂ 73 to 79, ♀ 63 and 71. All the specimens accord well with Boulenger's description (Catalogue, Vol. I., p. 301), however, no labial touches the eye, except in one example, where the 3rd just finds contact. Suboculars intervene above the labials, that above the 3rd when distinct from the præocular being usually very small. The anterior sublinguals touch 4 (not 3) infralabials. The scales are 17 in the whole body length.

It is a singular snake in many shield characters and especially in the possession of a single broad internasal and a similar single-broad præfrontal, and on this account alone is probably unique among our Indian snakes. The labials 5 with the 5th very long and none touching the eye normally are also remarkable. The posterior sublinguals are separated by one or a pair of small scales. In many shield characters it is so different from the only other species classified

with it in this genus that I think it extremely probable it will have to be separated and relegated to a genus by itself.

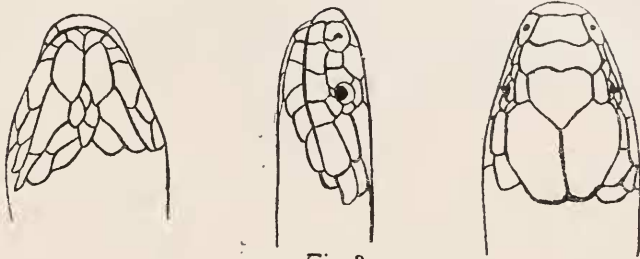


Fig. 3
Rhabdops bicolor
(x 2)

Anomalies.—In one specimen the præfrontal is divided into 3 subequal shields placed transversely, but this specimen in other respects so completely accords with my other examples that I consider there are insufficient grounds for making it a species apart. In one ♀ the last two subcaudals are entire (*i.e.*, 70th and 71st).

This snake bears a remarkable superficial resemblance to certain homalopsids, *viz.*, *Hypsirhina enhydris* and *H. plumbea*, and even a greater likeness to *Helicops schistosus*. It is uniform glossy olive-brown, or olive-green dorsally, the last 3 costal rows and the underparts being bright yellow.

Food.—One example contained a large earthworm “in gastro”. One that was brought in alive, and seemingly unhurt, allowed itself to be handled freely without betraying fear or attempting to escape. When teased, it coiled up, hid its head, and refused to move, even when smartly tapped on the tail, or pinched sufficiently to cause pain. It was a most inoffensive little creature.

Blythia reticulata.

Three examples, all ♂. Ventrals, 122 to 132 (?) Subcaudals, 23 to 25. The largest measured $9\frac{7}{8}$ inches, and this species ranks among our smallest representatives of this family, probably *Trachischium monticola* alone successfully emulating it for this distinction.

The scales are 13 in the whole body length. The eye in life is a black bead, no pupil being discernible. In colour it is blackish

dorsally, but, if closely viewed, a sparse punctiform mottling may be seen in the middle of each scale. The belly is uniform black.

I encountered one in broad daylight crossing a jungle road. It made no attempt to escape, but lay extended, and when captured and handled, evinced no seeming uneasiness, offering no resistance. It was a very quiet attractive little creature.

Lycodon fasciatus.

Thirteen specimens, 6 ♂, 7 ♀. The longest was a ♀, 3 feet and $\frac{3}{4}$ inch, but a ♂ nearly equalled it measuring 3 feet and $\frac{1}{4}$ inch. The smallest specimen was $8\frac{1}{2}$ inches in length.

The scales in this species are 17 anteriorly, 17 in midbody and 15 posteriorly, and the reduction is effected by an absorption of the 4th row above the ventrals into that above or below. Ventrals, ♂ 201 to 208, ♀ 206 to 213. Subcaudals, ♂ 77 to 79, ♀ 74 to 80.

Food.—Two examples had recently fed. In one instance a skink *Lygosoma indica* had been taken and in the other probably the same species.

Breeding.—The smallest specimen, $8\frac{1}{2}$ inches long, was, I believe, a hatchling, and was found in a nursery on the 19th of September in the same house from which I had obtained an adult ♀, 2 feet and $\frac{1}{2}$ an inch long, on the 16th of August. If my surmise is correct, here again, the breeding season is notably late, if comparison is made with *Lycodon aulicus* in the plains.

The anal glands secreted a copious custard-like material, which was found as abundant in the hatchling as in adults.

I found the slough of a snake, undoubtedly of this species, adhering to the irregularities in the bark of a pine tree of considerable girth, (about 18 inches diameter). It was situated at least five feet from the ground, with no intervening branches. The position served to indicate that this species is as deft a climber as others of the genus *Lycodon*—a conclusion that, I think, might have been inferred from the angulate character of the ventral shields.

The iris is heavily flecked with grey, a colour I have never seen in any other snake as far as I can remember, and the fact that it is visible at all seems to me sufficient justification for doubting whether this species is properly included among the genus *Lycodon* (where the iris is invisible and the whole eye like a jet bead).

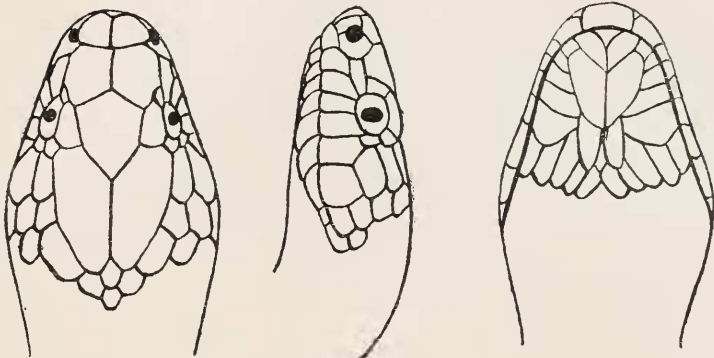


Fig. 4

Lycodon.
fasciatus.
(× 3)

All my specimens were annulated with black in their entire length, the bands numbering from 32 to 38 on the body and 15 to 20 on the tail. The black is glossy, and many of the anterior, and posterior bands are complete ventrally. They are broader anteriorly, involving about 9 or 10 scales vertebrally; narrower posteriorly, involving 3 or 4 scales. Their outlines are very irregular, though well defined, and the intervals are wheat or dove coloured. In colouration it very closely resembles members of the genus *Dinodon*, with most of which I am very familiar. It especially reminds me of *D. japonicus*.

Zaocys nigromarginatus.

One specimen only, a very fine ♀ 6 feet 6¼ inches long; the tail 1 foot 11 inches. Ventrals, 201. Subcaudals, 130 (?) (the tail perhaps slightly docked). The scales were 16 anteriorly, 16 in midbody, and 14 posteriorly. The reduction from 16 to 14 arose from a confluence of the 2nd and 3rd rows above the ventrals, and occurred very close to the mid point of the body.

The secretion of the anal glands was blackish, an unusual colour I have hitherto only seen in the Kraits (*Bungarus*).

It is difficult to realise from museum specimens the extreme beauty and brilliancy of colouring of many snakes in life, and this forcibly applies in the present instance. My specimen was a bright green of

so soft a hue that the skin looked like velvet. This merged into yellowish-green anteriorly, and yellow posteriorly, the latter merging into a rich black on the tail. The black margins to the scales served to enhance the beauty of the dorsal green. The head was olive-brown with a bright yellow patch low on the temporal region. The chin and throat were white, sparsely speckled at first, more heavily later, with light cerulean blue, which merged to blue-green, then pale greenish, and, finally, yellow in the length of the snake. Some grey speckling was seen beneath the tail.

Zamenis korros.

Two specimens. A ♀ 5 feet $3\frac{1}{4}$ inches long, the tail 1 foot $10\frac{3}{4}$ inches. Ventrals, 178. Subcaudals, 145. The scales in this species are 15 anteriorly, 15 in midbody, and 11 posteriorly. In the reduction from 15 to 13 the 3rd row above the ventrals disappears, being absorbed into the 2nd or 4th rows. In the step from 13 to 11 the same absorption occurs.

On the 16th of September I saw two specimens on the Ghat road below Shillong (4,500 feet). The first, about 4 or 5 feet long, was lying by the side of the road, in an attitude of attention with head and forebody erect, gazing at me, and remained so long enough for me to make a swift dart at it. I caught and examined it, fixed its identity, and then released it. The second I met face to face, but failed to capture. It was gazing out of a low bush, and on sighting me withdrew with great alacrity, and disappeared.

Coluber porphyraceus.

Three specimens, 1 ♂, 1 ♀, and the sex of one was not determined. The ♂ was 2 feet 11 inches long, the ♀ of similar dimensions. In the ♂ the tail was $\frac{1}{4}$ inch longer than in the ♀. The scales in this species are 19 anteriorly, 19 in midbody, and 17 behind. The reduction from 19 to 17 is brought about by the fusion of the 4th and 5th rows above the ventrals.

The secretion of the anal glands is brown in colour. All these specimens were dark, and of a peculiarly handsome hue, much resembling that of raw beef. I mention this, because it is not unusual to meet with light specimens in which the prevailing hue is somewhat of a dove colour.

Coluber radiatus.

One specimen, a ♂, 4 feet 5 inches long, the tail $10\frac{1}{2}$ inches. Ventrals, 237. Subcaudals, 93. Peculiar in having a single post-ocular on both sides. The scales in this species are 19 anteriorly, 19 in midbody, and 17 posteriorly. The reduction from 19 to 17 is caused by the coalescence of the 4th and 5th rows above the ventrals. It had eaten a mouse.

Oligodon dorsalis.

One specimen, a ♀, 1 foot $2\frac{1}{4}$ inches in length (the tail $1\frac{1}{2}$ inches). Accords in all particulars with Boulenger's description of this species (Catalogue, Vol. II., p. 241), except in the number of the subcaudals. Though the difference in the number of these shields in my specimen, viz., 28, and the number given in Boulenger's description, viz., 37 to 51, is considerable, and the importance attaching to these shields in this genus is great, I do not feel justified in claiming for my specimen specific identity on this solitary ground.* The ventrals are 185.

Prior to this I had found another example of this species in a very mutilated condition on the Ghat road, which I was unable to identify. The few scale characters that could be made out with certainty exactly accorded with my second specimen, including the colour and markings, which are very distinctive. It was a ♀, and egg-bound, two eggs, which from their size must have been nearly matured were extruded from the belly. The specimen was about the same length as the second one to which I have alluded first. The subcaudals were 29.

The scales in my perfect specimen were 15 anteriorly, 15 in midbody, and 13 posteriorly. The reduction from 15 to 13 was occasioned by a confluence of the 3rd and 4th rows above the ventrals. This arrangement of scales is typical of most of the genus *Simotes*. At least I have hitherto found it so, but I have not had access to every species known. On the other hand, I have previously found that the species belonging to the very closely allied genus *Oligodon*, with one exception known to me, viz., *venustus*, preserve the same number of

* Since writing this I have received a specimen through Mr. Millard from Mansi Katha, Upper Burma. It is a ♂, the ventrals are 166, and the subcaudals 46, and it is perfectly clear to me now that the low numbers of subcaudals in my Khasi specimens are of sexual import only.

rows in their entire body length. I think it still remains to be conclusively shown that some of the species now assigned to these two genera are not misplaced. I still expect to find that *O. venustus* has better claims to rank with *Simotes* and that *dorsalis* should be considered likewise a *Simotes* rather than an *Oligodon*.

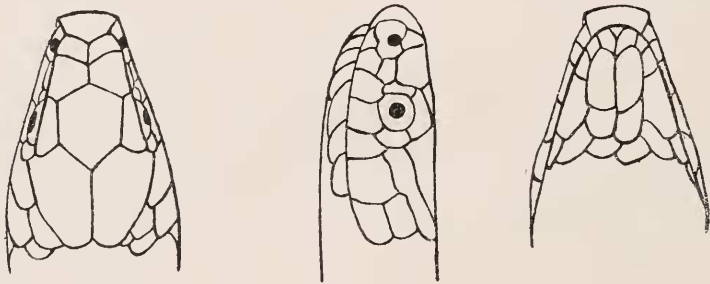


Fig. 5
Oligodon dorsalis
($\times 3$)

My specimen has a handsome light vertebral band from the nape to the tail tip of a colour like what is called a light chestnut in equines. This is well defined by black lines running down the row adjacent to the vertebral. The outer half of this same row, and the whole of the row below are dark cigar-brown. The rest of the dorsal aspect is blackish, with a black line running along the confines of the 2nd and 3rd rows above the ventrals. The head is finely speckled with black. There are two conspicuous black belts on the tail—one basal and one subterminal. The belly is richly ornamented with stripes of jet-black and enamel-white, occupying the whole or half the width of each ventral, and irregular in distribution. The tail beneath is bright yew-berry red, unspotted and unbanded, and very similar to that seen in *S. cruentatus*. It is a very handsome little snake.

Ablabes frenatus.

Three specimens, all ♂. The largest 2 feet and $\frac{1}{2}$ an inch. Ventrals, 154 to 155. Subcaudals, 95 to 97. The scales are 15 in the whole body length.

The secretion of the anal glands is custard-like.

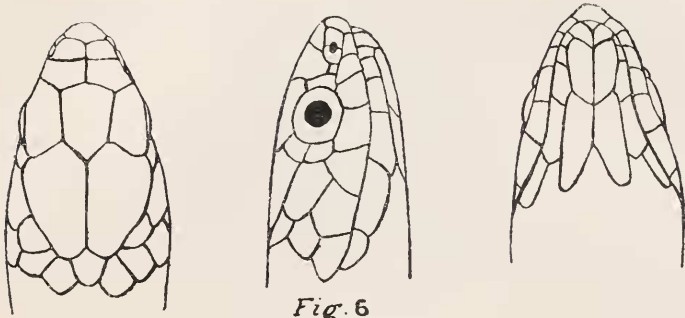


Fig. 6
Ablabes frenatus
(x 2)

Anomaly.—Two temporals on one side in one specimen.

They are all olive-brown, and apparently uniform in colour till one separates the scales when their edges and interstitial skin are seen to be alternately black and white, excepting the last row which is black both above and below and the vertebral which is black on both edges.

Subfamily 5.—DIPSADOMORPHINÆ.

Dipsadomorphus cyaneus.

One ♀ specimen from Nongpho on the Ghat road (1,800 feet). Length, 4 feet 2 inches; the tail 1 foot and $\frac{1}{4}$ of an inch. The scales are 21 anteriorly, 21 in midbody and 15 posteriorly. The first reduction from 21 to 19 is effected by the absorption of the uppermost costal into the vertebral; in the next from 19 to 17 the 3rd and 4th rows above the ventrals blend; and the last step from 17 to 15 is the same as the first. The first and second steps occur close together.

The posterior sublinguals are quite separated (an important point in assisting the division of this genus into species). The anal glands when pressed squirted out an extremely fine jet of thin limpid secretion, similar to what I have observed in some vipers, but, as far as I can recollect, not in other colubrines. This fluid was very abundant, and possessed a peculiar odour neither agreeable nor offensive.

The specific name *cyaneus* is not appropriate since the creature in life is green. In this specimen the hue, though not bright, was certainly one covered by the simile foliaceous-green. This colour very rapidly disappears in spirit. I preserved my specimen in whisky for want of another agent, and within 24 hours a decided change of

colour to blue had taken place, which makes me think it probable that the godfathers (Dumeril and Bibron) did not see the type specimen in life.

Psammodynastes pulverulentus.

18 examples, 9 ♂, 8 ♀, 1 unsexed. The largest a ♀, 2 feet and $\frac{3}{4}$ of an inch. Ventrals, ♂ 158 to 166, ♀ 160 to 173. Subcaudals, ♂ 52 to 68, ♀ 53 to 65. The scales are 17 anteriorly, 17 in mid-body, and 15 posteriorly. The reduction from 17 to 15 is due to an absorption of the 4th row above the ventrals, either into the row above or below.

Food.—Lizards and frogs. I found the following lizards “in gastro,” *Ptyctoloema gularis*, *Lygosoma indica*, on two occasions, and a tail which from its length and colour probably belonged to *Calotes jerdoni*. The frogs taken on two occasions were too digested to identify.

Breeding.—A small specimen, $7\frac{1}{2}$ inches long, is evidently this year’s production. It was brought in on the 21st September, but I am unaware as yet of the length of the young at birth, another $8\frac{1}{4}$ ” long was obtained in October (I have lately in this Journal reported the viviparous habit of this species).

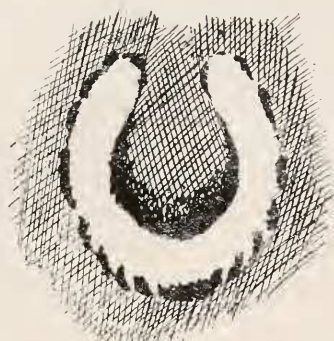
A ♀ on the 18th September contained some ovarian follicles which appeared to me from their colour and size to be impregnated, and another on the 19th September led me to the same conclusion. In the latter some of these measured $\frac{8}{20}$ of an inch.

If my assumption is correct, it is a remarkable circumstance. I met with one specimen only in my walks abroad, though it is one of the commonest snakes about Shillong. I succeeded in capturing it after some trouble, as it made strenuous efforts to evade me, and showed much activity and spirit. Knowing well the character of the species I was dealing with, I had to treat it with due respect and caution.

Subfamily 8.—ELAPINÆ.

Naia tripudians.

A ♀, 5 feet 2 inches long, was brought to me on the 18th August. Ventrals, 187. Subcaudals, 52. The scales were 25 anteriorly, 23 in midbody, and 15 posteriorly. Colour uniform olive-brown. The hood-mark as shown in the accompanying figure is a modification of the monocellus typical of variety *fasciata* (Gray).



Hoodmark of
Cobra
(*N. trijudians*)

I may here remark that three different people in Shillong independently told me that a month or two before my visit a juggler had come round having in his possession a perfectly uniformly bright green cobra. I can find no reference to such a colour variety in the literature on this snake. I tried to trace this man, but he had evidently left the place, so that I could obtain no information as to where he obtained the specimen. Singularly enough the first time I had ever heard of such a colour variety was a week or two before my visit to Shillong. My informant was Mr. W. Tottenham, Conservator of Forests, who mentioned that he had once met with such a specimen in North Siam at a place called Nan on the Mekong River. He described it as erecting its hood and behaving in every way like a cobra, differing only in its colour from usual specimens.

Naia bungarus.

The "Bsein yong" of the Khasis, meaning black snake. A single ♀ 6 feet 6½ inches was brought to me on the 21st September. It was reported to have been seen entering a house close to the Shillong bazaar early in the morning, and was pursued, and killed. Ventrals 254, subcaudals 88, the first 12 entire, the rest divided. The scales were 17 anteriorly, 15 in midbody and 15 posteriorly. The step from 17 to 15 occurred just after the site I select for numbering the scales anteriorly, viz., two heads lengths behind the head, and the

reduction was due to the absorption of the 4th row above the ventrals, into the 3rd on one side, the 5th on the other.

The supracaudals were everywhere in even rows, a matter for remark. In almost all other snakes where the subcaudals are entire the supracaudals are in odd rows (vide *Bungarus*), and where the subcaudals are partly entire partly divided, the supracaudals are in odd rows corresponding to the entire, and in even corresponding to the divided subcaudals.

The secretion of the anal glands was like white paint in colour, and consistency.

It was quite black dorsally, but when the scales were separated, the light bands, often so conspicuous on this creature, were seen to be present though obscure. The head was brown with black sutures, and the throat a dull orange. At first sight it bore a remarkable superficial resemblance to a dark specimen of *Zamenis korros*, but was also so much like a black cobra that many I think might have been deceived.

Whilst out butterfly catching on the Ghat Road below Shillong (circa 3,000 feet) I encountered one of a somewhat similar length, and found myself suddenly at uncomfortably close quarters to it. Having dismounted to secure a specimen I wheeled my bicycle to lean it against the bank of the cutting, when within a foot or so of me I became aware of the snake as it lay extended in the drain some eighteen inches or so deep. It appeared to be drinking in the trickle of a stream diverted into this channel. It reared its head, faced me for an instant, during which time I distinctly viewed its head shields, and made off into the jungle at about the moment when I had realised its identity. This specimen was quite black. A fatality which occurred in Shillong this year prior to my visit I think there can be little doubt must be attributed to this species. My informant was Mr. Rita, who could vouch for the following facts. Hearing one afternoon about 3 p.m. a great commotion near his house, enquiry elicited the information that a party of 30 coolies was in the act of removing the carcass of a pony belonging to a native neighbour. Mr. Rita had actually seen this pony alive and well in its stall about 12 p.m. the same day. He was informed that it had been attacked by a large snake which was seen twined round the animal's neck by servants who fled precipitately, so that the reptile

escaped without any attempt being made to kill it. The pony died shortly afterwards with great swelling about the neck and shoulders, and the carcase was already highly offensive when the coolies were removing it.

Callophis maclellandi.

12 specimens, 8 ♂, 4 ♀. All were adults varying from 1 foot $3\frac{1}{4}$ to 1 foot $11\frac{3}{4}$ inches. Ventrals : ♂ 188 to 201, ♀ 209 to 216 ; subcaudals : ♂ 28 to 32, ♀ 26 to 30. The scales in this species are 13 in the whole body length.

Anomalies.—In a previous paper in this Journal* I have remarked upon the contact of the 3rd supralabial with the nasal in the genus *Callophis*, a peculiarity seen only in the allied genera *Doliophis*, *Hemibungarus* and *Naja*. My series of specimens of *maclellandi* shows me that the contact of these two shields is not invariable, in fact failed in 4 specimens. This being so one must be prepared for a possibly similar inconstancy in other species of these genera. In one specimen the 3rd, 4th and 5th labials touched the eye and in another the 4th and 5th subcaudals were entire. I find the pupil in this species is often indiscernible, but in some specimens a small arc of ruddy gold may be seen.

The secretion of the anal glands is custard-like.

All specimens conformed to Boulenger's variety A. (Catalogue, Vol. III, p. 399). This is a remarkably handsome species, the shade of red on the back is much like that of fresh raw beef, sometimes rather brighter and in all specimens lighter and brighter in the flanks, where it is often a bright carrot-red. The black bands from 16 to 26 on the body and 3 to 4 on the tail are always narrow, involving about 2 scales. They are usually but not always outlined with pale yellow, or buff, and are interrupted slightly in the flanks, on the last row and the edge of the ventrals, but re-appear, and extend across the belly. The head is glossy jet-black with a well defined enamel white cross bar. In one specimen this bar was pale yellow. The belly is sulphur yellow, and the intervals between the bands heavily marked with irregularly-shaped black patches.

The two or three specimens I saw alive lead me to think it is a very quiet inoffensive little snake. I could not provoke them to exhibit temper in spite of much teasing.

* Vol. XVII, p. 56.

Family—AMBLYCEPHALIDÆ.

Amblycephalus monticola.

Three specimens, all ♀; two were adults, the largest 2 feet 5½ inches, the third one of this year's production measuring 8½ inches, was brought in on the 12th September. Ventrals 189 to 195, subcaudals 76 to 78. The scales are 15 in the whole body length. The præocular touches the internasal, a very unusual character, as far as I am aware only to be seen in *Naia tripudians*, and some specimens of *Xylophis perroteti* among Indian snakes. In midbody the vertebral scales are seen to be much enlarged, quite as broad as long, and this enlargement is found to originate in the neck by the confluence of two rows of scales, similarly to what obtains in the genus *Dendrophis*, but different from the genus *Bungarus* where the enlargement is progressive from behind the parietals. Boulenger (Catalogue, Vol. III, p. 443) records the supralabials as 7, the 3rd or 3rd and 4th touching the eye. In all my specimens no labials touched the eye.

The secretion of the anal glands is custard-yellow.

The iris is profusely speckled with mustard-yellow.

In life the prevailing ground colour is a dull orange, much the shade of dried orange peel.

Food.—One adult had swallowed a large slug; the other adult contained two large specimens of the same slug "in gastro." The slugs were sent to the Indian Museum, and identified as belonging to the genus *Auchenia*.

Family—VIPERIDÆ.

Lachesis monticola.

The "B'sein longkru" of the Khasis. 23 specimens, 2 ♂, 15 ♀, 6 not sexed. The two largest both ♀ measured 2 feet 3¼, and 2 feet 4¾ inches. Ventrals: ♂ 142 to 143, ♀ 144 to 151; subcaudals: ♂ 45 to 46, ♀ 37 to 46. Of 18 specimens in which the scales were examined they were as follows:—

Number of specimens.	Anterior.	Midbody.	Posterior.
11	23	23	19
2	23	23	17
1	25	25	21·20
1	25	25	19·17
1	21	21	17
1	21	22	19
1	23·21	21	19

In no specimen was a subocular shield present, and this is the easiest guide to the identification of the species. In view of the fact that Anderson has recorded two examples in which the 2nd supra-labial did not enter the loreal pit * I paid special attention to this very important point in identification, which I have always found most constant in all the species. There was no exception to the rule among my specimens, but more than once this shield appeared to be divided. A closer scrutiny proved the apparent division to be merely a furrow, not a suture, and this has led me to wonder if Anderson might have been mistaken.

Anomalies.—The 2nd subcaudal was entire in one example, and the last 4 in another.

Food.—Only one had recently fed, a young specimen $11\frac{1}{2}$ inches long which had swallowed a mouse.

Breeding.—8 specimens were this year's production varying from $7\frac{5}{8}$ to $9\frac{7}{8}$ inches in length.

The anal glands secrete a watery, limpid, fluid which is stored in considerable quantity. Pressure at the base of the tail causes this to squirt out in a fine jet such as issues from the needle of a hypodermic syringe. It possesses a peculiar but not exactly an offensive smell, resembling in some degree that of resin. In a specimen $11\frac{1}{2}$ inches long I found the secretion similar to, and as abundant as in adults.

It is one of the commonest snakes, and quite the most abundant poisonous species occurring about Shillong. Like many other vipers it is truculent, striking upon small provocation, and it evidently frequently wounds the naked feet of the incautious native pedestrians in this locality. My snakeman in trying to effect the capture of an adult he found in a deep hole was bitten in the finger. He suffered immediate and severe pain, and the hand and arm even to the loose tissues below the armpit swelled rapidly, and considerably. Blood continued to ooze for a long time (hours), and that shed did not clot. He suffered from a severe local hæmorrhage the next day, but although his blood was materially altered in composition, no constitutional effects, nervous or other, supervened, and he recovered in three or four days, and volunteered his services as a snakecatcher

* Ann. Zool. Res., Yunnan, pp. 832 and 3.

again. The medical aspect of the case and treatment were fully reported by me in the *Indian Medical Record*. (Nov. 1907.)

This appears to be the only record of a case poisoned by this snake if we except the instance recorded by Stoliczka * where a cooly was wounded by a small specimen $14\frac{1}{4}$ inches long. This case one may infer was one of snakebite, not snake poisoning, since the man is reported to have been dosed with alcohol, and continued marching the rest of the day with no ill effects.

Another cooly who brought me two specimens one morning told me that he had just been bitten by one, and I saw a slight wound on his right ankle from which blood was oozing, and the surrounding parts were slightly swelled. He had placed a single cord rather tightly above the wound, refused my proffered surgical attention, and showed no apprehension, telling me the snake was a harmless one. A few days later I saw him, and he said he had suffered very little in consequence. The wound was healed, and he told me he had applied ginger to it after infliction.

I played with one large adult brought alive. I found its movements in progression slow, but when it struck, the blow was delivered with great alacrity. Teased with ordinary objects, a handkerchief, a stick, &c., it showed supreme indifference, but when I suddenly altered my position from an upright to a squatting one, although at a safe distance, it struck out towards me with great malice and celerity. This it repeated several times though it could not be provoked to bite inanimate objects. My thoughts reverting to a passage in Buckland's Work "Curiosities of Natural History" (p. 215) which reads as follows:—"That the Arabs wore red buskins, and drawers, with the evident purpose of exciting, and teasing the snakes, who can't bear this colour near them, and as in the case of the common viper always fly at it when brought into contact with them"—I thought the present a good opportunity to test the accuracy of the assertion.

Accordingly after having teased it with many other agents, I brought my child's toy engine coloured vermilion into action. This was advanced towards it at varying rates of speed, but although the creature lay facing it, it neither retracted nor turned its head but

* *Journ., Asiatic Soc., Bengal, Vol. XXXIX, pp. 224 to 226.*

allowed the wheels to come into contact with, and even override and rest upon its coils without betraying fear or annoyance. An equal degree of contempt was manifested with dahlias of various shades of red.

Lachesis jerdoni.

A single small specimen.

Lachesis gramineus.

Three specimens, 2 ♂, 1 ♀. Ventrals: ♂ 158 to 171, ♀ 156; subcaudals: ♂ 64 to 65, ♀ 57. The scales in all were alike and conformed to the arrangement of the vast majority of specimens of this species. Anteriorly and in midbody they are 21, posteriorly 15. The three reductions in the rows from 21 to 15 are somewhat variable, but arise from a confluence of the 4th to 7th rows above the ventrals.

In one specimen the postocular streak was particoloured, white below, liver above. At the angle of the mouth these two hues were reversed and carried down the whole body as a flankline along the last costal row.